

## TOUR HIGHLIGHTS

Argonne National Laboratory seeks solutions to pressing national problems in science and technology. The nation's first national laboratory, Argonne conducts leading-edge basic and applied scientific research in virtually every scientific discipline. Argonne researchers work closely with researchers from hundreds of companies, universities, and federal, state and municipal agencies to help them solve their specific problems, advance America's scientific leadership and prepare the nation for a better future. With employees from more than 60 nations, Argonne is managed by the UChicago Argonne, LLC for the U.S. Department of Energy's Office of Science.

**The Advanced Photon Source (APS)**, which is an Office of Science user facility funded by the U.S. Department of Energy, is one of the most technologically complex machines in the world. This premier national research facility provides the brightest high-energy X-ray beams in the Western Hemisphere to more than 5,700 scientists each year from every U.S. state, the District of Columbia, Puerto Rico, and many countries around the world. These scientists come to the APS from academia, industry, medical schools, and other research institutions to carry out experiments that promises new discoveries in nearly every scientific discipline, including materials science; life science; chemistry; environmental, geological, and planetary science; and physics. The X-ray beams provided by this remarkable facility enable the collection of data in unprecedented detail and in amazingly short time frames. The knowledge these researchers gain at the APS has a real and positive impact on our technologies, our health, our economy, and our fundamental understanding of the materials that make up our world.

**Transportation Research** – The Advanced Powertrain Research Facility staff at Argonne National Laboratory performs vehicle systems and component evaluation in-situ as an independent technology reviewer with vast expertise. Argonne has long standing experience providing in-depth analysis of vehicle and component efficiency, and benchmarking of advanced electrified vehicles for the U.S. Department of Energy and other partners. Research includes targeted vehicle instrumentation and measurement of fuel economy, emissions and power and energy flows from chassis dynamometer testing. Component efficiency is also assessed with hardware-in-the-loop capabilities for transient operations. Smart Grid interoperability and Codes and Standard governance are areas with key Argonne engineering leadership. In addition, Argonne has developed expert software tools, i.e. Autonomie, for modeling and simulation of advanced propulsion technologies.

**The Center for Nanoscale Materials (CNM)** at the U.S. Department of Energy's Argonne National Laboratory is a premier national user facility for interdisciplinary nanoscience and nanotechnology research by academic, industrial, and international researchers. These scientists and engineers are provided with state-of-the-art capabilities to fabricate, process, characterize, and model nanoscale-sized materials. The synergy that results from teams of chemists, materials scientists, physicists, theorists, and engineers working together in the nanoscale regime results in truly remarkable projects and advancements. The center's scientific portfolio includes energy-related research and development

**The Argonne Leadership Computing Facility (ALCF)** is one of two leadership computing facilities in the nation dedicated to open science and is supported by the U.S. Department of Energy (DOE) Office of Science. The ALCF provides researchers with access to high-performance computing capabilities to enable breakthrough science and engineering. It began operation in 2006 with its team providing expertise and assistance to support user projects to achieve top performance of applications and to maximize benefits from the use of ALCF resources.

High-performance computing is becoming increasingly important as more scientists and engineers use modeling and simulation to study complex chemical processes, exotic new materials, advanced energy networks, natural ecosystems and sophisticated energy technologies. Mira, the ALCF's 10-petaflops Blue Gene/Q supercomputer that is currently the 5<sup>th</sup> fastest in the world, helps researchers tackle more complex problems and create more robust models of everything from jet engines to the human body.